E & A
IMP. BUR.

The SPINOSE EAR TICK

and METHODS of TREATING INFESTED ANIMALS

by Marion Imes
Zoological Division

FARMERS' BULLETIN 980
United States Department of Agriculture
Contribution from the Bureau of Animal Industry
John R. Mohler, chief
WASHINGTON, D.C.
MAY, 1918.

EAR TICKS are blood-sucking parasites which infest the ears of cattle, horses, sheep, dogs, and other animals. They are prevalent in the semi-arid sections of the southwestern part of the United States, where they cause heavy losses among live stock.

The parasites can not be eradicated by dipping, but they may be controlled and the losses prevented by injecting into the ears of infested animals a mixture of pine tar and cottonseed oil.

A brief description of the tick, its life history, and instructions for treating infested animals are given in this bulletin.

THE SPINOSE EAR TICK AND METHODS OF TREATING INFESTED ANIMALS.

CONTENTS.

	Page.		Page.
Nature and habits of the tick	3	Treatment	6
Detecting the ticks	4		

THE SPINOSE EAR TICK[1] takes its common name from the characteristic spines on the body of the young tick and from its habit of locating in an animal's ears. This parasite is especially prevalent in the semiarid sections of the southwestern United States, the infested area extending, however, as far north as Nevada and even into Oregon. The climatic conditions in parts of Texas, Oklahoma, New Mexico, Arizona, and California seem to be favorable for the rapid multiplication of ear ticks, which have become very important pests in those States. The ticks remain attached in the ears of animals for several months, and shipments of live stock from the infested area to various points in the United States cause the ticks to become widely disseminated. Moisture, however, is apparently detrimental to the ticks during certain stages in their life cycle, since they do not seem to be able to flourish in any part of the United States except the semiarid sections of the West.

Among domesticated animals the ticks are found most frequently in the ears of cattle, horses, dogs, and sheep, although under favorable conditions they often attach themselves to any other mammal, including man, with which they come in contact. Wild animals, especially jack rabbits, in the infested areas often are grossly infested, and as the movement of wild animals can not be controlled, the eradication of the ticks by any method of excluding susceptible animals from infested areas so as to bring about the starvation of the ticks appears to be impracticable.

Serious damage to live stock is caused by these parasites in the areas where they are abundant. It is not unusual to find the ear canals of cattle and horses completely filled with a mingled mass of ticks and particles of earwax and other matter (fig. 1, *A*). As many as 80 ticks by actual count have been taken from one ear of a cow selected at random from an infested herd. The parasites puncture the tender skin of the ears and suck blood from the animal. The wounds thus caused often ulcerate and result in a condition commonly known as ear canker. The constant irritation and possible toxic effects of the ticks cause nervous and digestive disturbances which result in the lowering of the vitality of infested animals, with consequent lessening of the milk flow in dairy herds and a failure of all classes of live stock to thrive and gain weight normally. Old range cows and weak, poorly nourished animals when grossly infested often succumb during late winter and early spring.

NATURE AND HABITS OF THE TICK.

As has been shown by investigations conducted by the Bureau of Entomology, spinose ear ticks do not spend their entire life on the animal. They enter the ears of the animal as small, active, six-legged seed ticks or larvæ, not easily visible to the naked eye. They usually attach themselves to the tender skin inside the ears below the hair line, where they are protected from natural enemies as well as from the

[1] *Ornithodoros megnini.*

efforts of the animal to dislodge them. They begin at once to engorge with blood and in a week or two are fully engorged and although still small have grown to several times their original size. The engorged larvæ are inactive, grublike in appearance, and of a yellowish-white or pink color (fig. 1, *B*). The engorged larva sheds its skin and the young tick or nymph emerges, provided with eight legs (fig. 1, *C*). The skin of the nymph is covered with numerous small spines, from which the species derives its name of spinose ear tick (fig. 1, *D* and *E*). The nymphs before they begin to engorge are about the same size as the engorged larvæ, that is, about one-eighth of an inch in length (fig. 1, *C*). They attach themselves to the skin lining of the ear, suck blood, and slowly increase in size. Occasionally they change their location. Unless destroyed or accidentally dislodged they remain in the ears for from 1 to 7 months, or until they are fully grown and completely gorged with blood. Their length then ranges from about one-third to two-fifths of an inch (fig. 1, *E*). Finally, upon the completion of their development as parasites they drop out of the ears and usually crawl up several feet from the ground, secreting themselves in dry protected places such as cracks and crevices in buildings, fences, corral walls, and trees. In such places the nymphs undergo their transformation into adult ticks, mating of the sexes occurs, and there also the eggs are laid. A few days after leaving the animal the ticks shed their skins and are then fully mature (fig. 1, *F* and *G*.)

The skin of the adult, unlike that of the nymph, is without spines. So far as known the adult never attaches itself to animals nor does it take food. Mating occurs after the ticks have shed their skins and have transformed into the adult stage. Females which do not find a mate have been known to live more than a year. Soon after mating the females begin laying eggs. Egg-laying may be intermittent and continue over a period as long as six months. When egg-laying is completed the females die. The eggs may hatch as early as 10 days after they are laid. Shortly after hatching the seed ticks are ready to attach themselves to any suitable animal with which they come in contact. They have been known, however, to live nearly three months without doing so.

DETECTING THE TICKS.

When animals are grossly infested and the ear canals packed full of ticks the parasites are visible on superficial examination, but when the degree of infestation is light or moderate the ticks may be overlooked. They usually attach themselves in the deep folds of the ear or crawl into the ear canal and follow it inward, sometimes as far as the eardrum. As the ticks increase in size and others enter, they and their excretions with the wax from the ear of the animal accumulate in masses or plugs sufficient in some cases to close up the ear passages completely. These conditions give rise to various symptoms. The infested animal usually shakes its head and repeatedly turns it from side to side, meanwhile inverting first one ear and then the other. When irritation and itching are more intense on one side the animal often turns its head so that the more seriously affected ear is held inverted. There is a tendency to rub and scratch the ears, and young animals often run as though endeavoring to relieve the nervous tension. Horses and dogs seem to be more sensitive than cattle to the pain and irritation. They scratch and rub their ears, shake their heads, and often lie down and roll, rubbing their ears on the ground.

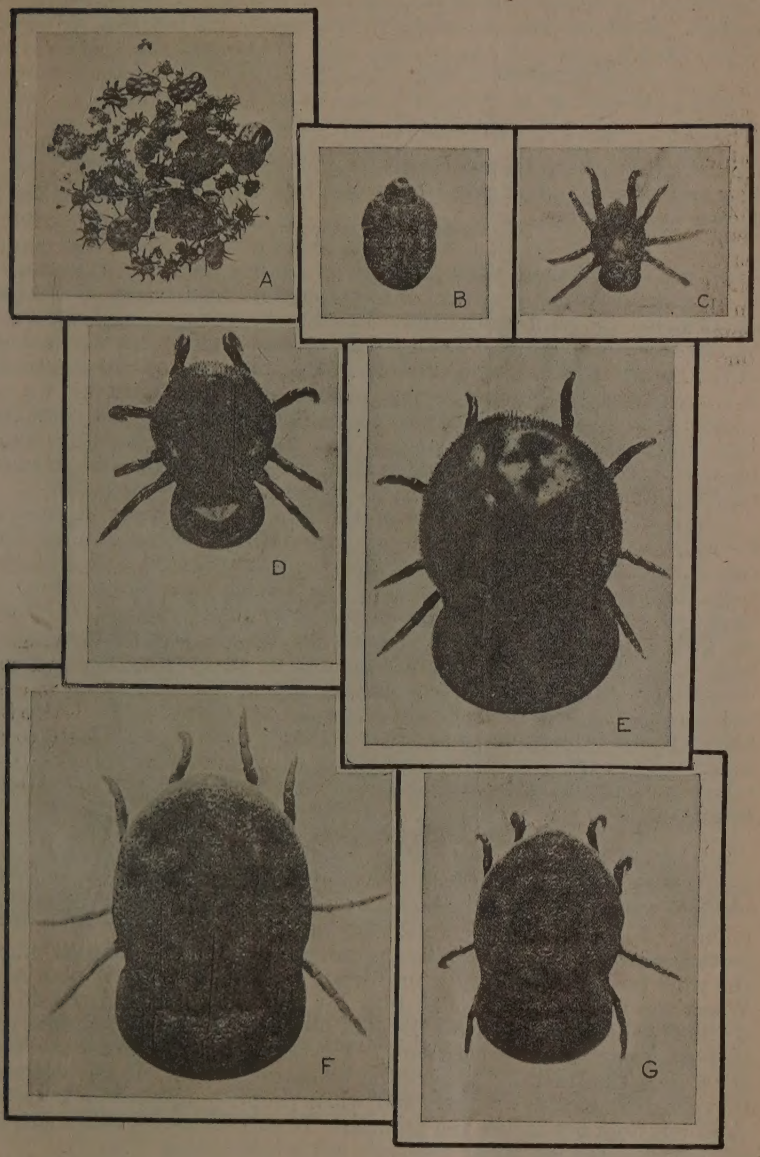

FIG. 1.—*A*, ear ticks and débris from ear of cow (about natural size). *B*, engorged larva (magnified 5 times). *C*, young tick (magnified 5 times). *D*, partially engorged young tick (magnified 5 times). *E*, fully engorged young tick (magnified 5 times). *F*, adult female (magnified 5 times). *G*, adult male (magnified 5 times).

In all cases where ear-tick infestation is suspected the animals should be examined and if no ticks are visible the ears should be probed. A convenient and effective instrument for probing the ears,

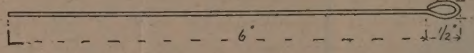

FIG. 2.—Ear probe made of baling wire.

removing ticks from the ear canals, and breaking down masses of earwax and ticks may be made from a piece of ordinary baling wire, as shown in figure 2.

TREATMENT.

On account of their habits and great vitality, and the wide range of the animals which they may infest, complete eradication of spinose ear ticks is a very difficult matter. Results of investigations conducted by the Bureau of Animal Industry have shown that dipping in any of the known dips is not effective in killing the ticks or causing them to leave the ears. The only effective method of treatment known at present is to apply the remedy by hand directly into the ear passages (see illustration on front page). The remedies commonly recommended, such as bland oils, crude petroleum, various dips, etc., are not effective, and they are of use only as vehicles for other remedies.

For a number of years some of the live-stock growers in the infested areas have used kerosene or gasoline in treating animals for ear ticks. When applied undiluted these substances will kill the ticks, but they cause blistering of the tender skin lining the ear passages and may produce deafness, especially in horses or dogs. As both kerosene and gasoline evaporate rapidly, they offer no protection against immediate reinfestation. Consequently these remedies are not suitable for use in the ears of domesticated animals, and under no circumstances should they be used on horses or dogs. Chloroform, either undiluted or mixed with a bland oil, is commonly used in the ears of horses and dogs. It is effective, but, like the other remedies mentioned, it affords no protection against reinfestation.

THE PINE-TAR-COTTONSEED-OIL REMEDY.

An effective remedy against ear ticks was formulated by the Bureau of Animal Industry and thoroughly tested during its field investigations. This remedy consists of a mixture of two parts by volume of ordinary commercial pine tar and one part by volume of cottonseed oil. In mixing the ingredients add the cottonseed oil to the pine tar and stir until a uniformly smooth mixture is obtained. When the weather is cold the pine tar and cottonseed oil should be warmed so they will mix readily and flow freely, but they should not be heated more than is necessary. The mixture will remain uniform for a long time without separation or deterioration. It is relatively inexpensive, easy to prepare, and when properly applied it kills the ticks but does not injure the animals. It may be used on any species of domesticated animals.

Cottonseed oil is a fairly good solvent for earwax, and the mixture penetrates ordinary loose masses of earwax and ticks, but it will not penetrate the hard masses. It not only kills all ear ticks with which it comes in contact, but being of a sticky consistence it remains in the ears and protects the animals against reinfestation for about 30 days.

RESTRAINING THE ANIMALS FOR TREATMENT.

The farmer who has but a few gentle farm animals to treat does not need any special equipment for restraining them during treatment. They may be tied to a post, held by an attendant, or restrained by any of the well-known methods. But in treating herds of wild range cattle or horses it is necessary to provide special equipment. Most animals oppose the insertion of anything into their ears, and therefore the prime object of restraint is to have the head held as quietly as possible and the ears readily accessible to the operator. A dehorning chute equipped with a stanchion is one of the best arrangements for restraining cattle during treatment for ear ticks. Branding chutes with "squeeze gates" are also satisfactory for this purpose. The entrance chute at dipping corrals, or any other available cattle chute may be used (fig. 3).

If it is necessary to construct a chute especially for the purpose it should be about 3 feet wide and from 4 to 6 feet high, depending on the nature of the animals to be treated. When the sides of the chute

FIG. 3.—Chute filled with cattle ready for treatment; one side of chute made of iron pipes.

are more than 4 feet high footboards should be constructed along the sides, so that the operator may work over the top of the chute and not through the openings in the sides. When cattle are crowded closely in the chute, with the exit and entrance closed, they may be treated without additional restraint.

INSTRUCTIONS FOR TREATING ANIMALS.

An ordinary metal or hard-rubber syringe holding from 1 to 2 ounces is the best instrument to use for injecting the pine-tar-cotton-seed-oil mixture. A metal syringe is preferable because it is not so liable to break as one of hard rubber. Have the mixture warm enough to flow readily in the syringe. Fill the syringe, grasp the ear with the left hand, insert the syringe nozzle into the opening of the

ear canal, and inject about one-half ounce of the fluid, manipulating the ear to force the mixture into the deeper parts (fig. 4). Hold the ear in an upright position for a few seconds after the injection to allow the fluid to settle into the canal and adhere to the tissues.

The mixture kills only those ticks with which it comes in contact; consequently if the ear passages contain hard masses of ticks and ear-wax such masses should be broken down and scraped out with a wire loop (fig. 2) before treatment is applied.

FIG. 4.—Treating cattle for ear ticks, showing animals crowded in chute and method of holding and manipulating the ear.

If an excessive quantity of the fluid is injected, the surplus overflows from the ears and runs down over the head and face, where it may cause blistering, especially in horses. The mixture causes very little irritation in the ears, but if it comes in contact with those parts of the skin covered with hair that are exposed to the sun's rays, blistering results and the hair may come out. No more should be applied than the ear will retain; about one-half ounce in each ear is sufficient for cattle and horses.

After having had sufficient practice to become familiar with the operation one man can treat from 20 to 30 cattle an hour. In treating large herds two or more men may work along each side of the chute and in this way a large number of animals can be treated in a day.

NUMBER OF TREATMENTS NECESSARY.

When properly used one application of the pine-tar-cottonseed-oil mixture is usually sufficient to kill all ticks in the ears of the animal at the time of treatment. It should be remembered, however, that the eggs of the tick are not deposited or hatched in the ears of the animal, and a new crop of seed ticks may find lodgment at any time on animals kept in infested places. The pine-tar and cottonseed-oil mixture remains in the ears for a considerable length of time and may be depended upon to protect the animal against reinfestation for about 30 days. In some cases it seems to afford protection for several months. Animals in the infested area should be examined at frequent intervals and treatment applied as often as necessary to protect them against the discomfort and losses caused by ear ticks. Herds grazing on infested ranges should be treated late in the fall or early in the winter to prevent the winter and spring losses caused by the ticks in poorly nourished range cattle. All animals in an infested herd should be treated whether they show infestation or not.

WASHINGTON : GOVERNMENT PRINTING OFFICE : 1918